

Type 3271

Hand-operated Actuator Type 3273

Application

Linear actuator for attachment to final control elements, particularly suitable for Series 240, 250, and 280 Control Valves

Diaphragm area 1400 and 2800 cm²

Travel Up to 160 mm

The Type 3271 Pneumatic Actuators are diaphragm actuators equipped with a rolling diaphragm and internal springs.

Special features

- Low overall height
- Low friction
- Various bench ranges by varying the number of springs and their compression
- No special tools required to change the bench range and to reverse the actuator action (also for tandem actuator and version with handwheel)
- Continuous operation at temperatures from -35 to +90 °C
- Type 3273 Hand-operated Actuator for travels up to 80 mm

Versions

- **Type 3271 Pneumatic Actuator** (Fig. 1) · Effective diaphragm area of 1400 cm² with 60 mm travel (1400-60) or effective diaphragm area of 2800 cm² with 160 mm travel
- **Type 3271 Pneumatic Tandem Actuator** (Fig. 2) · Effective diaphragm area of 2 x 2800 cm²
- **Type 3271 Pneumatic Actuator with Type 3273 Hand-operated Actuator** · For travels up to 80 mm using side-mounted handwheel (Fig. 10), effective diaphragm area of 1400 or 2800 cm²
- **Type 3271 Pneumatic Actuator with Handwheel** · Using side-mounted handwheel (Fig. 11) for travels up to 160 mm, effective diaphragm areas of 2800 or 2 x 2800 cm²
- **Type 3271 Actuator with Travel Stop** (sectional drawing 5) Minimum or maximum travel mechanically adjustable for 1400 cm² versions with 60 mm travel and 2800 cm² versions as well as 2 x 2800 cm² tandem actuators

Further versions

For other process media (e.g. water)

For high temperatures up to 120 °C or low temperatures down to -40 °C · On request

Type 3273 · Hand-operated Actuator without pneumatic actuator, operated using side-mounted handwheel for travels up to 80 mm · On request



Fig. 1 · Type 3271 (1400-60) with Type 3251 Control Valve



Fig. 2 · Type 3271 Tandem Actuator with 2 x 2800 cm²

Principle of operation

The signal pressure p_{st} generates a force $F = p_{st} \cdot A$ on the diaphragm area A (2). This force is balanced by the actuator springs (4). Taking into account the rated travel, the number of springs and their compression determine the bench range. The travel H is proportional to the signal pressure p_{st} . The operating direction of the actuator stem (7) depends on the arrangement of the springs.

The stem connector (8) connects the actuator stem (7) with the plug stem (10) of the valve.

Fig. 10 shows the side-mounted **Type 3273 Hand-operated Actuator** for actuators with effective diaphragm areas of 1400 and 2800 cm² and a maximum **travel of up to 80 mm**. The handwheel (23) is fixed to the worm-gear shaft (20) and moves the actuator stem over the worm-gear wheel (21) and the threaded bushing (22).

A side-mounted handwheel as illustrated in Fig. 11 is available for valves with **120 mm travel**.

The adjustable **mechanical travel stop** (Fig. 5) is suitable for actuator version 1400-60 as well as 2800 cm² and tandem actuators. The actuator travel can be limited by up to 50 % in both directions (actuator stem "extends" or "retracts") and permanently adjusted.

The tandem actuator (Fig. 6) contains two coupled diaphragms; they produce a positioning force that is twice as high as the force of a single-acting actuator.

Actuators are available with the following fail-safe actions:

"Actuator stem extends (FA)"

The springs cause the actuator stem to move to the lower end position (sectional drawings, right) when the diaphragm is relieved of pressure or when the supply air fails.

"Actuator stem retracts (FE)"

The springs cause the actuator stem to retract (sectional drawings, left) when the diaphragm is relieved of pressure or when the supply air fails.

Legend

1 Signal pressure connection	14 Cap
2 Diaphragm	15 Nut
3 Vent	16 Spindle
4 Springs	17 Plain bearing
5 Diaphragm cases	18 Lock nut
6 Annular nut	20 Worm-gear shaft
7 Actuator stem	21 Worm-gear wheel
8 Stem connector	22 Threaded bushing
9 Coupling nut	23 Handwheel
10 Plug stem	

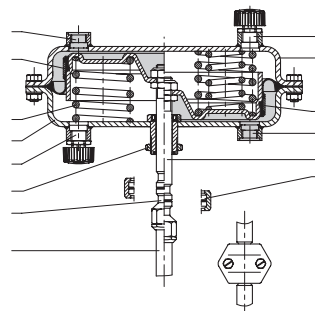


Fig. 3 · Sectional drawing of Type 3271 Pneumatic Actuator (right diaphragm half with additional springs)

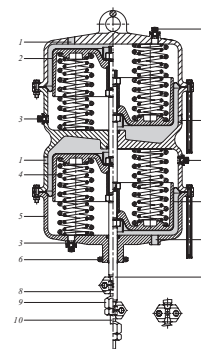


Fig. 4 · Tandem actuator with 2 x 2800 cm²

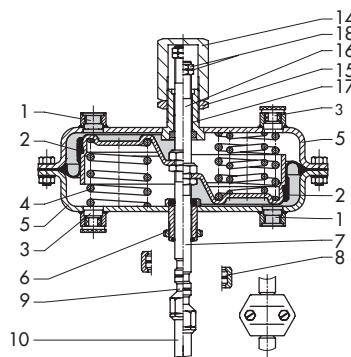


Fig. 5 · Type 3271 Actuator with adjustable travel stop

Throttling or on/off service

In throttling service, the Type 3271 Pneumatic Actuators can be used for supply pressures up to max. 6 bar.

In on/off service, the supply pressure must be reduced.

For fail-safe action "Actuator stem retracts (FE)", the permissible supply pressure must not exceed the upper bench range value by more than 3 bar.

Actuators to be used with reduced supply pressures are labeled accordingly.

Example

Bench range	Fail-safe action	Max. supply pressure
0.2 ... 1.0 bar	Actuator stem retracts	4 bar
0.4 ... 2.0 bar		5 bar
0.6 ... 3.0 bar		6 bar

For fail-safe action "Actuator stem extends (FA)" and travel stop, the supply pressure must not exceed the upper bench range value by more than 1.5 bar.

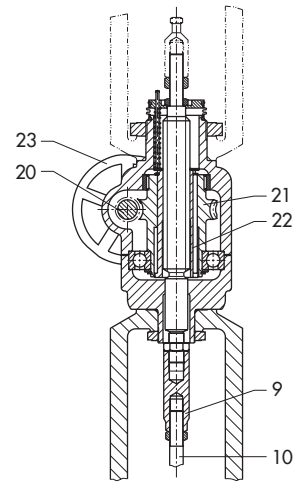


Fig. 6 · Type 3273 Hand-operated Actuator with side-mounted handwheel for max. 80 mm travel, up to 80 kN

Table 1a · Technical data for Type 3271 Pneumatic Actuator

Version	cm ²	1400-60	2800	2 x 2800
Maximum supply pressure		6 bar ¹⁾	6 bar ¹⁾	
Permissible temperatures in continuous operation		Standard material NBR -35 to 90 °C	Standard material NBR -35 to 90 °C	
		Special material EPDM (for air free of oil and grease) -35 to 120 °C		
Materials				
Rolling diaphragm		NBR (nitrile rubber)	NBR with fabric insert	
		Butyl with fabric insert		
		EPDM with fabric insert		
Actuator stem		1.4571	1.4548.4	
Actuator stem sealing		NBR (nitrile rubber)	NBR	
		EPDM		
Diaphragm cases		Sheet steel, powder-varnish coated	EN-JS1030 (GGG-40), powder-varnish coated	

1) Observe restrictions in on/off service as specified above

Table 1b · Technical data for Type 3273 Hand-operated Actuator

Version	3273 (Fig. 10)	3273 (Fig. 11)
Max. travel range	80 mm	160 mm
Permissible force	84 kN	210 kN
Permissible temperature	100 °C	100 °C
Materials		
Body	EN-JS1030 (GGG-40)	EN-JS1030 (GGG-40)
Spindle and threaded nut	1.4104/G-CuSn12Pb	EN-GJS-500-7 (GGG-50)/1.0503
Handwheel	Aluminum	EN-JL1040 (GG-25)

Table 1c · Available versions

Version	1400-60	2800 cm ²	2 x 2800 cm ²
Travel stop, on both sides	•	•	•
Type 3273 Hand-operated Actuator, max. 80 mm travel	•	• (max. 3 bar)	–
Side-mounted Type 3271 Hand-operated Actuator, max. 120 mm travel	–	•	•

Table 2 · Bench ranges for 1400 and 2800 cm² Pneumatic Actuators · All pressures in bar (gauge)

Values highlighted in gray apply to standard operation, i.e. operation at rated travel. The maximum travel can be achieved by increasing the signal pressure. Pretensioned springs cannot be used with fail-safe action "Actuator stem retracts" for Series 240, 250, and 280 Control Valves.

Effective diaphragm area [cm ²]	Rated travel [mm]	Travel volume at rated travel [dm ³]	Dead volume [dm ³]	Max. travel [mm] ¹⁾	Bench range [bar] (signal pressure range at rated travel)	Additionally possible spring compression [%]	Operating range with spring compression [bar]	Number of springs	Spring force at 0 mm travel [kN] ²⁾	Spring force at rated travel [kN] ²⁾	Thrust [kN] ²⁾ at rated travel and a supply pressure [bar] of					
											1.4	2.0	3.0	4.0	5.0	6.0
1400	60	8.3	5.7	80	0.2...1.0	25	0.4...1.2	6	2.8	14	5.6	14	28	42	56	70
					0.4...2.0		12	5.6	28	–	14	28	42	56		
					0.5...2.5		18	7	35	–	7	21	35	49		
					1.1...2.4		18	15.4	33.6	–	8.4	22.4	36.4	50.4		
					1.3...2.8		24	18.2	39.2	–	2.8	16.8	30.8	44.8		
2800	120	33	16.5	160	0.2...1.0	25	0.4...1.2	3	5.6	28	11.2	28	56	84	112	140
					0.4...2.0		6	11.2	5.6	–	28	56	84	112		
					0.5...2.5		9	14	70	–	14	42	70	98		
					0.6...3.0		12	16.8	84	–	28	56	84			
					0.9...1.6	25 ⁴⁾	1.1...1.8	6	25.2	44.8	–	11.2	39.2	67.2	95.2	123
					1.0...2.1		9	28	58.8	–	25.2	53.2	81.2	109		
					1.1...2.6		12	30.8	72.8	–	11.2	39.2	67.2	95.2		
					1.1...2.3	25	1.4...2.6	6	30.8	64.4	–	19.6	47.6	75.6	104	
					1.2...2.8		9	33.6	78.4	–	5.6	33.6	61.6	89.6		
					1.3...3.3		12	36.4	92.4	–	19.6	47.6	75.6			
2 x 2800	120	66	33	160	0.2...1.0	25	0.4...1.2	6	11.2	56	22.4	56	112	168	224	280
					0.4...2.0		12	22.4	11.2	–	56	112	168	224		
					0.5...2.5		18	28	140	–	28	84	140	196		
					0.6...3.0		24	33.6	168	–	56	112	168			
					0.9...1.6	25 ⁴⁾	1.1...1.8	12	50.4	89.6	–	22.4	78.4	134.4	190.4	246
					1.0...2.1		18	56	117.6	–	50.4	106.4	162.4	218		
					1.1...2.6		24	61.6	145.6	–	22.4	78.4	134.4	190.4		
					1.1...2.3	25	1.4...2.6	12	61.6	128.8	–	39.2	95.2	151.2	208	
					1.2...2.8		18	67.2	156.8	–	11.2	67.2	123.2	179.2		
					1.3...3.3		24	72.8	184.8	–	39.2	95.2	151.2			

1) Based on lower bench range value, not taking zero travel (to unseat the plug) into account (see Table 3a)

2) Specified forces refer to the bench range

3) Springs are already pretensioned

4) The maximum compression at 50 % rated travel is 50 %

Table 3 · Dimensions and weights

Table 3a · Versions without handwheel

Actuator	cm ²	1400-60	2800	2 x 2800
Height	H	197	520	1020
	H4 _{RatedFA}	165		315
	H4 _{maxFA}	169		325
	H4 _{maxFE}	185		355
	H6	54		85
	H7	90		110
	H8	180		500
Diameter	∅ D	530		770
	∅ D2	22		40
∅ d (thread)		60 x 1.5	100 x 2	100 x 2
a (optional)		G 3/4		G 1
		3/4 NPT		1 NPT
Weight in kg				
Without handwheel		70	450	950

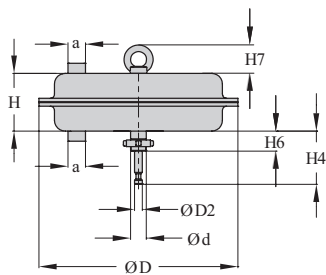


Fig. 7 · Type 3271 Actuator, version 1400-60

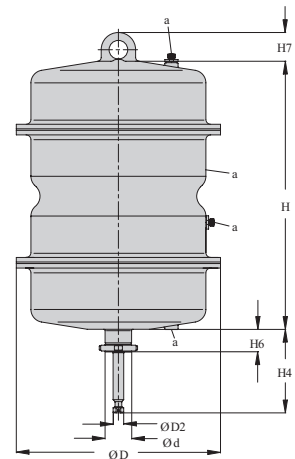


Fig. 9 · Type 3271 as tandem actuator

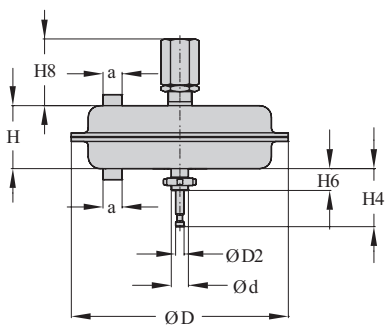


Fig. 8 · Version with mechanical travel stop

Table 3b · Type 3273 Hand-operated Actuator with side-mounted handwheel · Travel ≤ 80 mm

Control valve	DN	50 ... 100		125 ... 150		200 ... 250		300 ... 400	
Seat bore	mm	≤ 100		≤ 150		≤ 200		≤ 200	
Travel	mm	30		60		60		60	
Actuator	cm ²	1400-60	2800	1400-60	2800	1400-60	2800	1400-60	2800
H3	mm	932	1202	1032	1202	1032	1202	1117	1222
H5	mm	295	480	395	480	395	480	480	500
H9	mm	395	480	395	480	395	480	395	480
Weight with actuator	kg	140	575	155	575	155	575	175	575
Weight w/o actuator	kg	70		70		70		70	

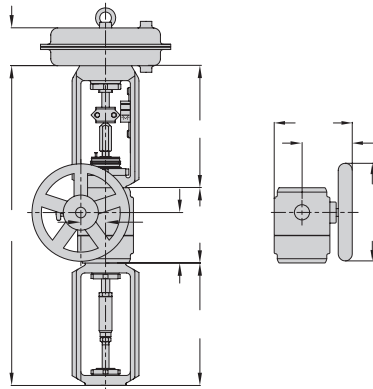


Fig. 10 · 1400 and 2800 cm² version
for max. 80 mm travel, up to 80 kN

Table 3c · Pneumatic actuator and hand-operated actuator with side-mounted handwheel · Travel up to 160 mm

Actuator	cm ²	2800	2 x 2800
H10	mm	1105	1105
H11	mm	220	220
Weight w/o actuator	kg	250	250

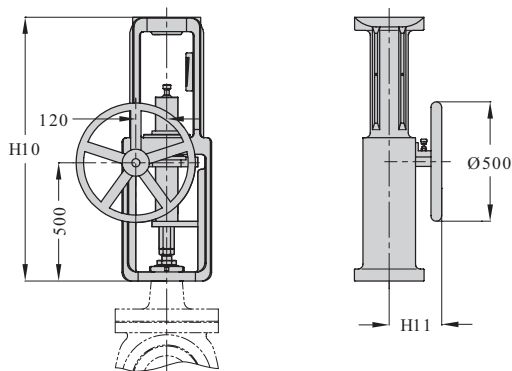


Fig. 11 · 1400 and 2800 cm² version
for travel >60 to 120 mm

Ordering text

Actuator	Type 3271
	Handwheel
	Travel stop
	Tandem actuator
Diaphragm area	... cm ²
Travel	... mm
Bench range	... bar
Fail-safe action	Actuator stem extends/retracts
Signal pressure connection	G ... / ... NPT
Rolling diaphragm	NBR/EPDM

Specifications subject to change without notice.

